UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,894	10/24/2003	Chan-Soo Hwang	678-1236 (P10806)	8693

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EXAMINER
BAYARD, EMMANUEL

ART UNIT	PAPER NUMBER
2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/29/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

	Application No.	Applicant(s)
Office Action Summary	10/692,894	HWANG ET AL.
	Examiner	Art Unit	
	Emmanuel Bayard	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>24 October 2003</u>.

2a) ☐ This action is **FINAL.**   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-13</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-10</u> is/are rejected.

7) ☒ Claim(s) <u>11-13</u> is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by
another filed in the United States before the invention by the applicant for patent or (2) a patent
granted on an application for patent by another filed in the United States before the invention by the
applicant for patent, except that an international application filed under the treaty defined in section
351(a) shall have the effects for purposes of this subsection of an application filed in the United States
only if the international application designated the United States and was published under Article 21(2)
of such treaty in the English language.

1.   Claims 1-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Papadias

et al U.S. Pub No 2003/0174782 A1.

As per claim 1, Papadias et al teaches a transmitter for transmitting complex

symbols in a wireless communication system, comprising: four transmitting antennas

(see fig.5 elements 105-1 to 105-4 and page 4 paragraph [0036]); and an encoder for

configuring four combinations for four input symbols so that a sequence of four symbols

can be transmitted once by each antenna during each time interval, and for transferring

the combinations to the transmitting antennas (see fig.5 element 140 and page 4

paragraph [0036]), wherein at least two symbols selected from the four input symbols

are each rotated by predetermined phase values (see fig.5 elements 150-1 to 150-2 and

page 4 paragraph [0042]).

As per claim 2, Papadias et al teaches, wherein the number of the selected

symbols is 2, and the selected symbols are associated with different metrics when a

receiver carries out a decoding operation (see pages 3-4 paragraphs [0033-0035]).

As per claim 3, Papadias et al teaches where QPSK (Quadrature Phase Shift

Keying) is used (see page 3 [0032]. Furthermore implementing wherein the phase

values are within a range of 21.degree. to 69.degree. with a center of 45.degree is

inherently taught by Papadias.

As per claim 4, Papadias et al teaches, QPSK and BPSK (see page 7 [0068].

Furthermore implementing wherein the phase values are within a range of 21.degree. to

24.degree. where 8PSK (8-ary Phase Shift Keying) is used is inherently taught by

Papadias.

As per claim 5, Papadias et al teaches, QPSK and BPSK (see page 7 [0068]).

Furthermore implementing wherein the phase values are 11.25.degree. where 16PSK

(16-ary Phase Shift Keying) is used is inherently taught by Papadias.

As per claim 6, Papadias et al teaches, wherein the encoder carries out negate

and conjugate operations and configures the four combinations so that at least some

sequences of four symbol sequences to be transferred to the respective antennas

during four time intervals are orthogonal to each other (see fig.5 and page 3).

As per claim 7, Papadias et al teaches, wherein the four combinations

configured by the four input symbols form a matrix consisting of four rows and four

columns (see page 6 [0055]). Furthermore implementing the matrix being given by: 12 [

j 1 s 1 s 2 s 3 * - j 4 s 4 * s 2 * - - j 1 s 1 * j 4 s 4 - s 3 s 3 j 4 s 4 - - j 1 s 1 * - s 2 * - j 4 s 4

* - s 3 * - s 2 j 1 s 1] where s.sub.1, s.sub.2, s.sub.3 and s.sub.4 denote the input

symbols, and .theta..sub.1 and .theta..sub.4 denote phase rotation values for the

symbols s.sub.1 and s.sub.4, respectively is inherently taught by Papadias

As per claim 8, Papadias et al teaches, wherein the four combinations

configured by the four input symbols form a matrix consisting of four rows and four

columns(see page 6 [0055]). Furthermore implementing the matrix being given by: 13 [

x 1 x 2 x 3 * x 4 * x 2 * - x 1 * x 4 - x 3 x 3 x 4 - x 1 * - x 2 * x 4 * - x 3 * - x 2 x 1] [x 1 x 2

x 3 * - x 4 * x 2 * - x 1 * x 4 x 3 x 3 x 4 - x 1 * x 2 * x 4 * - x 3 * - x 2 - x 1] [x 1 x 2 x 3 * -

x 4 * x 2 * - x 1 * - x 4 x 3 x 3 x 4 - x 1 * x 2 * x 4 * - x 3 * x 2 - x 1] [x 1 x 2 - x 3 * x 4 * x

2 * - x 1 * x 4 x 3 x 3 x 4 x 1 * - x 2 * x 4 * - x 3 * - x 2 - x 1] [x 1 x 2 - x 3 * - x 4 * x 2 * -

x 1 * x 4 - x 3 x 3 x 4 x 1 * x 2 * x 4 * - x 3 * - x 2 x 1] [x 1 x 2 - x 3 * x 4 * x 2 * - x 1 * - x

4 x 3 x 3 x 4 x 1 * - x 2 * x 4 * - x 3 * - x 2 - x 1] [x 1 x 2 - x 3 * - x 4 * x 2 * - x 1 * - x 4 x

3 x 3 x 4 x 1 * x 2 * x 4 * - x 3 * x 2 - x 1] [x 1 x 2 - x 3 * x 4 * x 2 * - x 1 * - x 4 - x 3 x 3 x

4 x 1 * - x 2 * x 4 * - x 3 * x 2 x 1] where x.sub.1, x.sub.2, x.sub.3 and x.sub.4 denote

four symbols containing two phase-rotated symbols is inherently taught by Papadias.

As per claim 9, Papadias et al teaches, wherein the four combinations

configured by the four input symbols form a matrix consisting of four rows and four

columns(see page 6 [0055]). Furthermore implementing the matrix being given by: 14 [j

1 s 1 j 2 s 2 - j 3 s 3 * - j 4 s 4 * - j 2 s 2 * - - j 1 s 1 * j 4 s 4 - j 3 s 3 j 3 s 3 j 4 s 4 - - j 1 s

1 * - - j 2 s 2 * - j 4 s 4 * - - j 3 s 3 * - j 2 s 2 j 1 s 1] where s.sub.1, s.sub.2, s.sub.3 and

s.sub.4 denote the input symbols, and .theta..sub.1 and .theta..sub.4 denote phase

rotation values for the symbols s.sub.1, s.sub.2, s.sub.3, and s.sub.4, respectively is

inherently taught by Papadias.

Double Patenting

2.   The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees.   A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3.   Claim 10 is provisionally rejected on the ground of nonstatutory double patenting over claim 1 of copending Application No. 10/692,896. This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

The subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows: a symbol arranger for receiving signals transmitted from four transmitting antennas to at least one receiving antenna during four time intervals; a channel estimator for estimating four channel gains indicating gains of channels from the four transmitting antennas to the at least one receiving antenna; first and second decoders each producing metric values associated

with all possible symbol sub-combinations using the channel gains and the signals

received by the symbol arranger and detecting two symbols having a minimum metric

value, each of the symbol sub-combinations containing two symbols; and a parallel-to-

serial converter for sequentially arranging and outputting the two symbols detected by

each of the first and second decoders.

Furthermore, there is no apparent reason why applicant would be prevented from

presenting claims corresponding to those of the instant application in the other

copending application. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA

1968). See also MPEP § 804.

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

5.   Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Walton

et al U.S. Pub No 2004/0120411 A1 in view of Naguib U.S. Pub No 2003/00864479 A1.

As per claim 10, Walton et al a receiver for receiving complex symbols in a

wireless communication system, comprising: a symbol demapper is functionally

equivalent to the claimed (symbol arranger) for receiving signals transmitted from four

transmitting antennas to at least one receiving antenna during four time intervals (see

fig.11 element 1132a and page 14 [0191]); a channel estimator for estimating four

channel gains indicating gains of channels from the four transmitting antennas to the at

least one receiving antenna (see fig.11 element 974 and page 1 [0009] and page 14

[0192]); first and second decoders each producing metric values associated with all

possible symbol sub-combinations using the channel gains and the signals received by

the symbol arranger and detecting two symbols having a minimum metric value, each of

the symbol sub-combinations containing two symbols (see fig.11 elements 1136a-1136s

and page 14 [0191]).

However Walton et al does not teach a parallel-to-serial converter for

sequentially arranging and outputting the two symbols detected by each of the first and

second decoders.

Naguib teaches teach a parallel-to-serial converter for sequentially arranging

and outputting the two symbols detected by each of the first and second decoders (see

fig.9a element 936).

It would have obvious to one of ordinary skill in the art to implement the teaching

of Naguib into Walton as to reconstitute the original data stream deliver from the source

as taught by Naguib (see page 6 [0089]).

Allowable Subject Matter

6.   Claims 11-13 are objected to as being dependent upon a rejected base claim,

but would be allowable if rewritten in independent form including all of the limitations of

the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

wherein each of the first and second decoders comprises: a symbol generator for

generating all possible symbol sub-combinations, each of the symbol sub-combinations

containing the two symbols; a phase rotator for rotating one symbol selected from the

two symbols by a predetermined phase value; a metric calculator for producing the

metric values for the symbol sub-combinations containing the phase-rotated symbol

using the signals received by the symbol arranger and the channel gains; and a

detector for detecting the two symbols having the minimum metric value using the

produced metric values.

Conclusion

7.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

Kim et al U.S. Pub No 2002/0101908 teaches an apparatus and method for detecting

signals of space-time coding.

Lee et al U.S. Pub No 2002/0044591 teaches a transmit diversity apparatus and

method.

Hammons, Jr et al U.S. Patent no 6,678,263 B1 teaches a method and constructions for

space-time codes.

You U.S. Pub No 2003/0021355 A1 teaches a method and system for transmitting and

receiving signal.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Emmanuel Bayard whose telephone number is 571 272

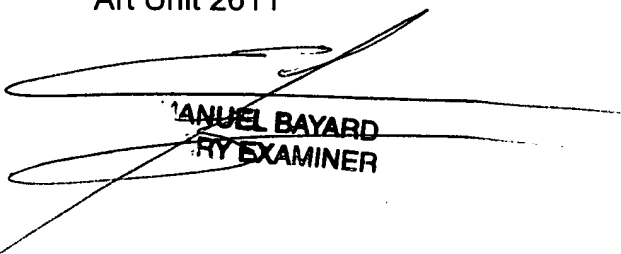3016. The examiner can normally be reached on Monday-Friday (7:Am-4:30PM)

Alternate Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Jay Patel can be reached on 571 272 2988. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Emmanuel Bayard
Primary Examiner
Art Unit 2611

12/22/06

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RY EXAMINER